

Name: _____ Date: _____

Surviving Mars Using Science: Performance Task

Report - Due Friday, Jan 17th

Answer the following questions using your notes and parts 1 and 2 of the performance task prep. Responses will answer these questions and organize key ideas learned throughout each of our four units of study: Space, Chemistry, Electricity, and Ecology.

The Science Behind the Colonization of Mars

Question 1: SPACE UNIT - Mars vs. Earth

- a) Compare Earth and Mars in terms of size, distance to the Sun, rotation, revolution, temperature ranges, composition, atmosphere, weather, gravity.
- b) Explain why Mars is inhospitable to life and how each of the following abiotic factors from a) could have an impact on humans ability to survive on Mars.

Question 2: ECOLOGY UNIT - A Sustainable Ecosystem on Mars

- a) What are the necessities of life? Explain how each of these necessities could be established on Mars, and whether technologies/science would need to be brought over from Earth. Explain why human survival and colonization on Mars is dependent upon the concept of sustainability?
- b) What does "Terraforming" a planet mean? What changes would Mars have to undergo in order to terraform this planet?

Question 3: CHEMISTRY UNIT - Chemistry to Support Life

- a) Electrolysis is a process that can be used for both life support and rocket fuel. Describe the process of electrolysis, explain how it supports life and creates rocket fuel, and discuss the dangers of the products created by this reaction.
- b) Plutonium is an element used to create vast amounts of energy. Identify the following atomic information for Plutonium: atomic symbol, atomic number, mass, number of protons, neutrons and electrons, classification, physical and chemical properties. Also, explain the pros and cons of using Plutonium as an energy source.

Question 4: ELECTRICITY UNIT - Creating Energy on Mars

- a) Explain the types of renewable and non-renewable energy sources that could likely be used to power colonies on Mars.
- b) Explain the pros and cons for each type of energy production on Mars.

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Marking Rubric

| Google Report | 1 | 2 | 3 | 4 |
|-------------------|---|--|---|---|
| Question 1 | Research is limited, lacking several details. Response is somewhat accurate. | Research is satisfactory, lacking 3-4 details. Response is mostly accurate. | Research is thorough, but lacking 1-2 details. Response is accurate. | Research is exceptionally thorough and detailed. Response is informative and accurate. |
| Question 2 | Research is limited, lacking several details. Response is somewhat accurate. | Research is satisfactory, lacking 3-4 details. Response is mostly accurate. | Research is thorough, but lacking 1-2 details. Response is accurate. | Research is exceptionally thorough and detailed. Response is informative and accurate. |
| Question 3 | Research is limited, lacking several details. Response is somewhat accurate. | Research is satisfactory, lacking 3-4 details. Response is mostly accurate. | Research is thorough, but lacking 1-2 details. Response is accurate. | Research is exceptionally thorough and detailed. Response is informative and accurate. |
| Question 4 | Research is limited, lacking several details. Response is somewhat accurate. | Research is satisfactory, lacking 3-4 details. Response is mostly accurate. | Research is thorough, but lacking 1-2 details. Response is accurate. | Research is exceptionally thorough and detailed. Response is informative and accurate. |